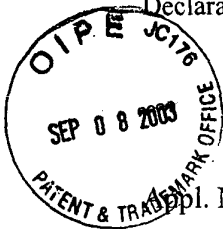


Appl. No.: 09/998,341

Declaration



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 09/998,341
Applicant : Harold R. Garner
Filed : November 29, 2001
Title : DIGITAL OPTICAL CHEMISTRY MICROMIRROR IMAGER

TC/A.U. : 1634
Examiner : Forman, B.

Docket No. : UTSW:1040

Commissioner for Patents
Washington, D.C. 20231

DECLARATION UNDER 37 C.F.R. § 1.131 OF PRIOR INVENTION IN THE UNITED STATES TO OVERCOME CITED REFERENCES

I, Harold R. Garner, being hereby warned that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon, declares the following:

1. I am the sole named inventor of U.S. Patent Applications: (1) Serial No. 09/326,526, filed June 4, 1999; (2) Serial No. 09/998,341, filed Nov. 29, 2001; and (3) Serial No. 09/999,239, filed Nov. 29, 2001, which claim priority to Provisional Patent Application Serial No. 60/087,948, filed June 4, 1998 and Application Serial No. 09/326,526, filed June 4, 1999, issued as U.S. Patent No. 6,295,153 on Sept. 25, 2001, all entitled "DIGITAL OPTICAL CHEMISTRY MICROMIRROR IMAGER,".
2. I am making all the statements contained herein of my own knowledge and these statements are true and are believed to be true.
3. I have over thirty years' experience managing private and academic laboratories and am a named inventor of over fifteen (15) issued or published U.S. Patents and U.S. Patent Applications.
4. I have reviewed the claims in the Amendment accompanying this Affidavit, namely, amended claims 39-56 directed to an apparatus for implementing digital optical chemistry. The evidence provided herein is commensurate with the extent of the invention as claimed in the Amendment.

5. I am making this Declaration to establish conception and reduction to practice of the invention as claimed in the Amendment filed concurrently herewith, United States Patent Application Serial No. 09/998,341, filed Nov. 29, 2001 prior to February 1998, which is the earliest date of the prior art cited by the Examiner in the Office Action mailed June 26, 2003. The art cited is: (1) Cerrina, et al., filed 23 February 1998, issued as U.S. Patent No. 6,375,903; and (2) Gao, et al., filed 1 February 1998, issued as U.S. Patent No. 6,426,184.
6. The Board of Regents, The University of Texas System is the owner of this and all related patent application by Assignment dated June 3, 1998, recorded on June 4, 1998 at reel 9217, frame 0897.
7. To establish the date of conception and reduction to practice of the invention in this application, the following photographs are submitted as evidence. The copy of a photograph attached hereto as Exhibit A was taken on or about August 1997 in Dallas, Texas, which is a date prior to the cited references.
8. Exhibit A demonstrates that the device as claimed in the Amendment was built and operating in the United States by August 1997, which is prior to the filing date of the references (February 1998) cited as prior art in this Application. From the photograph attached hereto as Exhibit A, it can be seen that the invention claimed in this application had been conceived and reduced to practice in the United States prior to 1 February 1998, and 23 February 1998, which are the effective date of the references cited against the claims in this Application.
9. Exhibit B, attached hereto, is a copy of Exhibit A that has been annotated for the Examiner's convenience. This affidavit, in conjunction with the affidavit under 37 C.F.R. § 1.131 filed in the parent application, demonstrate that the device was used to create a mask pattern formed and printed using the present device, and was therefore invented in the United States prior to the filing date of the art used as the basis for the rejection of the claims as filed in this case. Exhibit A and B demonstrate that the invention claimed in this application had been conceived and reduced to practice in the United States prior to 1 February 1998, and 23 February 1998, which are the effective date of the references cited against the claims in this Application.
10. Exhibits C-1 through C-6 are contiguous pages from a laboratory notebook dated November 11 and 12, 1997, that outline the steps and chemistry used to deposit a mask on a slide. Exhibit C-2 demonstrates that the apparatus as claimed and as shown in Exhibits A and B, and following the procedure outlined in Exhibit C-1, was able to produce a pattern in a reaction chamber as early as November 1997, which is prior to the filing date of the references (February 1998) cited as prior art in this Application. Furthermore, Exhibits C-4 through C-5 outline the steps used to demonstrate that the apparatus and methods were able to produce the pattern shown in Exhibit C-6. Figure 7 in the present application is a rendering of the original photograph with which the provisional application, to which this application claims priority, was filed that shows an

actual fluorochrome bound to a phosphoramidite base on a slide. From the laboratory notebook pages hereto as Exhibits C-1 through C-6, it can be seen that the invention claimed in this application had been conceived and reduced to practice in the United States prior to 1 February 1998, and 23 February 1998, which are the effective date of the references cited against the claims in this Application.

11. Exhibits D-1 through D-3 outline the steps used to modify a slide used in the apparatus of the present invention. Exhibit D-2, lower half outlines a first synthesis reaction in which a reaction chamber was used to add a CY-3 phosphoramidite to the prepared slide. Exhibit D-3 shows that in step (8) and *8) the substrate is irradiated and in step (9) the CY-3 is injected into the reaction chamber. In Exhibit D-3, following step (14) the striped pattern is confirmed as is the reaction chemistry. Exhibits D-1 through D-3 are dated October 1997, which is prior to the filing date of the references (February 1998) cited as prior art in this Application. From the laboratory notebook pages hereto as Exhibits D-1 through D-3, it can be seen that the invention claimed in this application had been conceived and reduced to practice in the United States prior to 1 February 1998, and 23 February 1998, which are the effective date of the references cited against the claims in this Application.

12. This declaration is submitted at prior to final rejection.

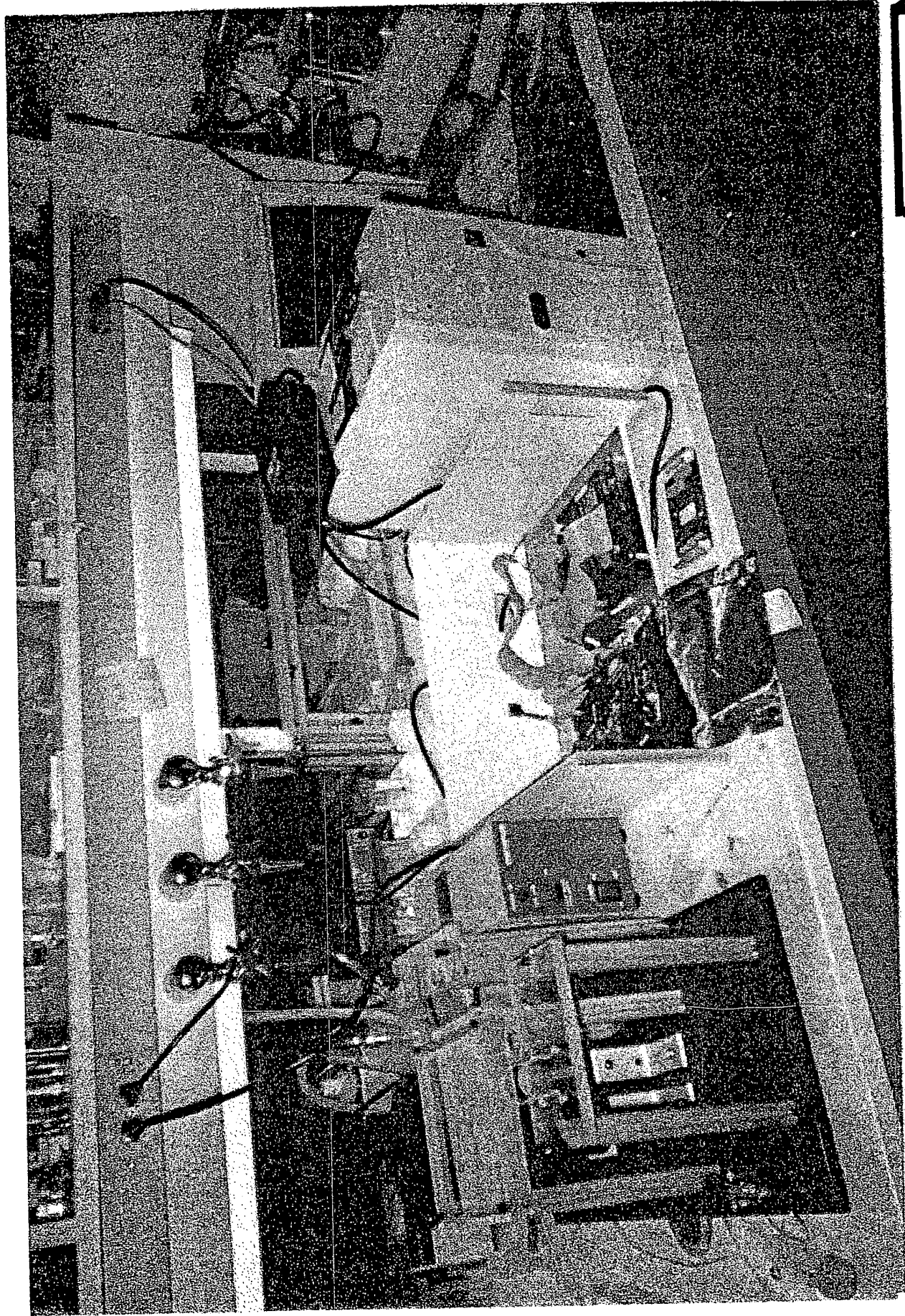
Date: 8/22/03

By: 

Harold R. Garner, Ph.D.
Inventor.

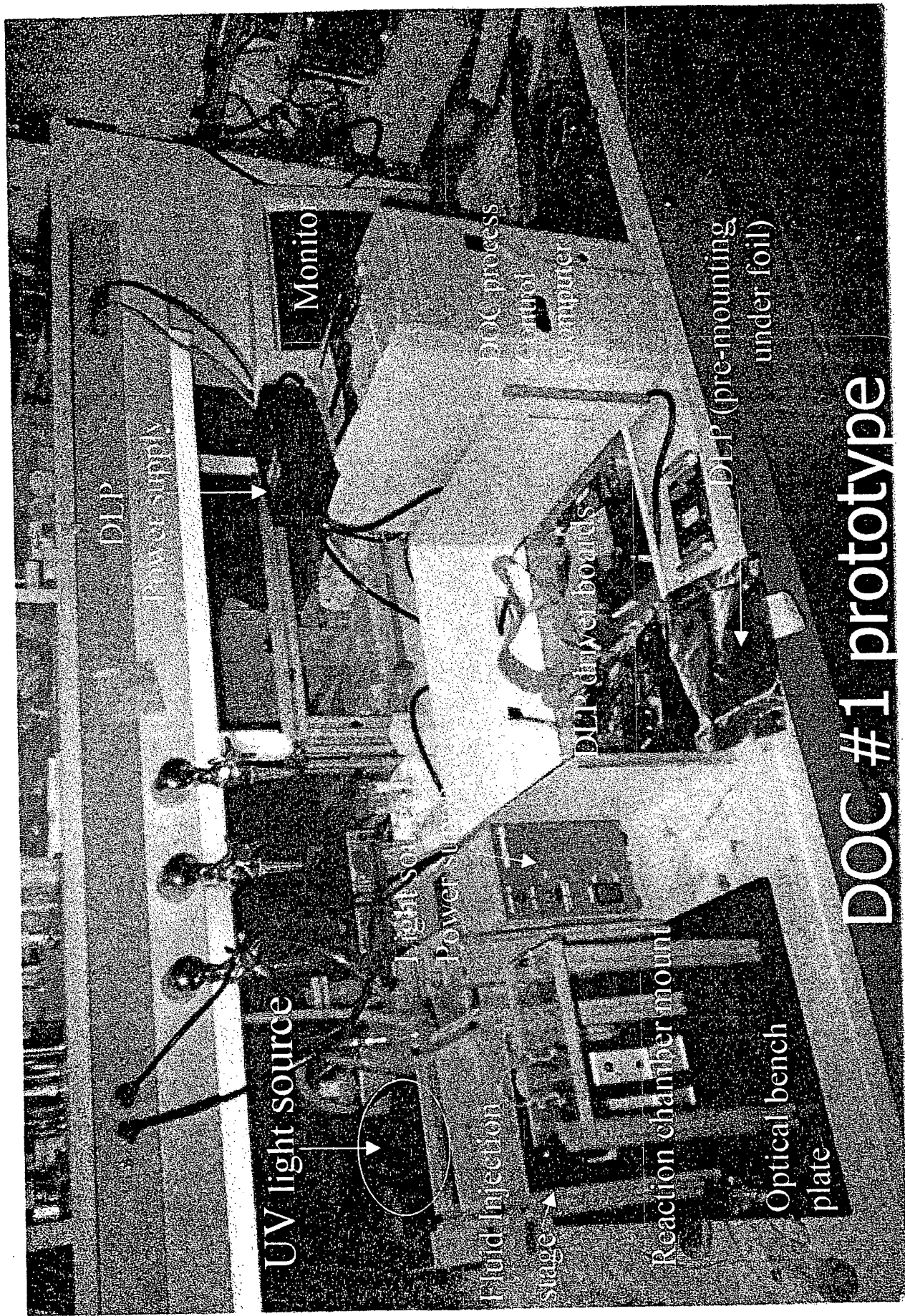
Residence address:
4100 Post Oak Road
Flower Mound, Texas 75028

Business address:
5323 Harry Hines Blvd, Mail Station 8591
Dallas, Texas 75390-9094



Exhibit

A



DOC #1 prototype

Exhibit

B

Page No. _____

- 1) Slide was modified with $(\text{Et}_3\text{O})\text{Si}(\text{CH}_2)_3\text{N}(\text{CH}_2\text{CH}_2\text{OH})_2$ as described on p. 114.
- 2) washed slide with Spacer 18 (Glen Research) + Activator followed by capping and oxidation.
- 3) Dried slide in desiccator for weekend.

Reaction on the Robert's machine:

- (1) Deblock ; wait (1 min), wash with CH_3CN
- (2) Activator + UV-PG-C-phosphoramidite ; wait, wash
- (3) Cap 1 + Cap 2 ; wait, wash
- (4) Oxidize ; wait, wash
- (5) UV-light ; 5 min, without any filter
- (6) Used mask wash
- (7) Activator + CY-phosphoramidite ; wait, wash

To Page No. _____

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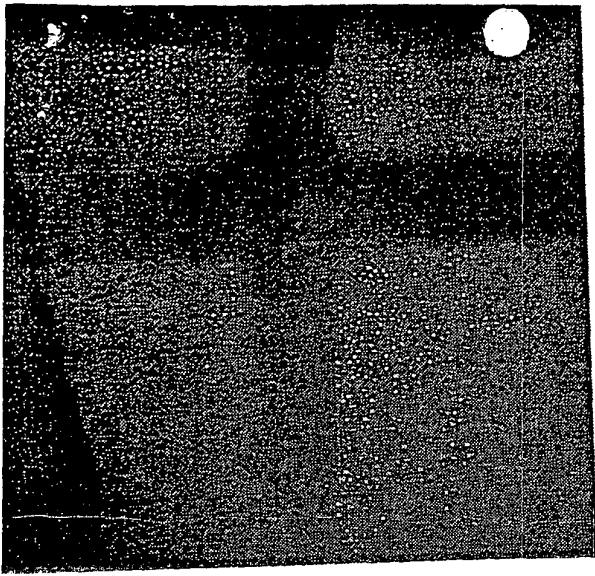
Date

11-11-92

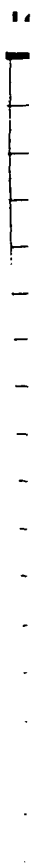
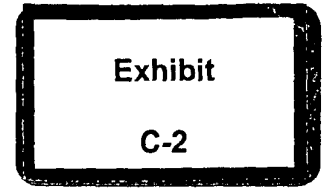
Invented by

Date

Recorded by



mask



11/11/97 15:35

Focus

Page 1

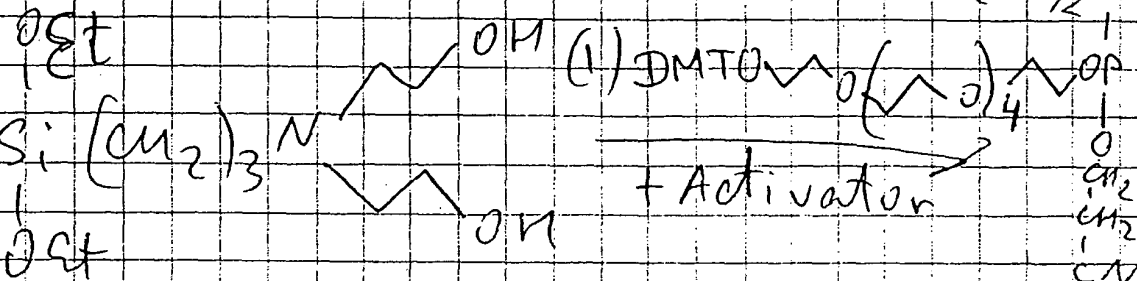
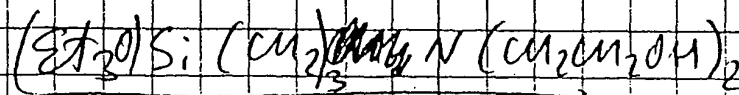
11-11-97

Recorded by

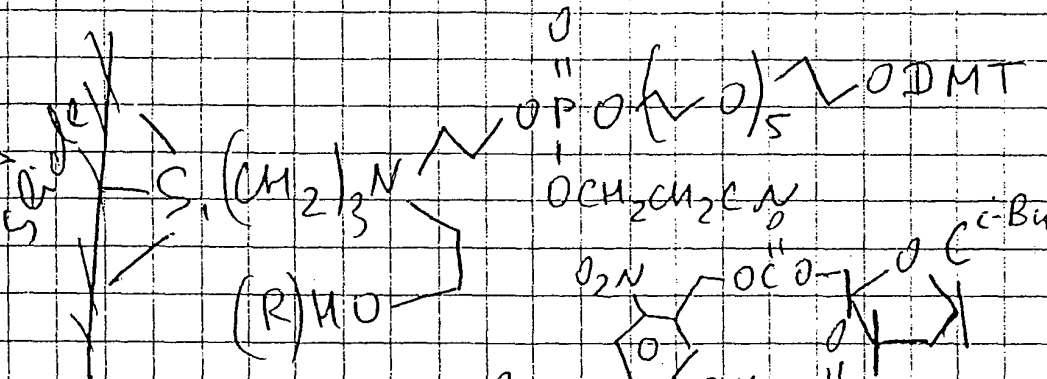
Chemistry of successful run:

Exhibit

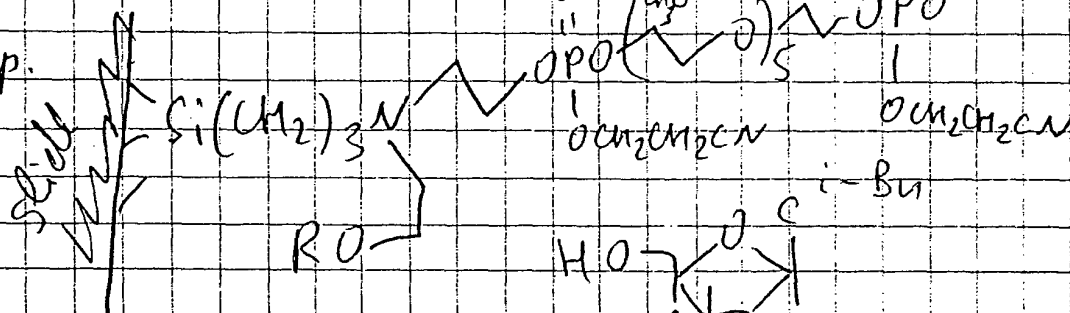
C-3



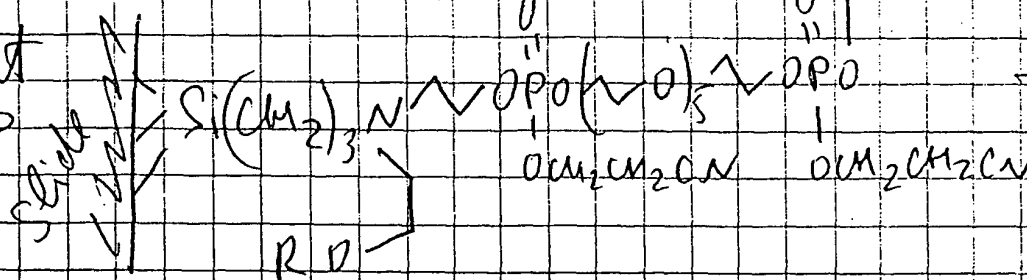
cap (3) oxidize



deblock

Activator +
+ UV-PG-C-phosp.cap
oxidize

UV-light



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Date

11-11-97

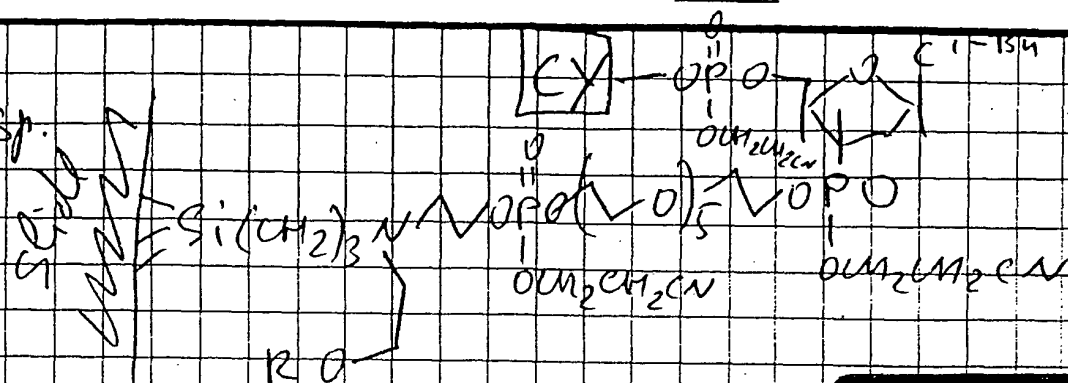
Invented by

Date

Recorded by

1) Act. + Cy-phosp.

2) oxidize



1/ make slides

modif
cy.

non-modif.
CY-3 →

C-4

To Page No.

Used & Understood by me,

Date _____

Invented by

Date _____

11-11-97

Exhibit

C-5

MMTD

Used $\text{Si}(\text{CH}_3)_3\text{N}(\text{CH}_2\text{CH}_2\text{OH})_2$ PEPED SLIDE PREPARED BY ~~TR~~
 YES AS SHOWN ON PG 119.

~~ADDED~~

~~Put SLIDE ON ACTIVATION DEVICE. ADD 1:1 DEBLOCKER: ACTIVATOR.~~

~~CAPPED (1:1, CAP A:CAP B)~~

WASH = ACETONITRILE

~~OXIDIZED (I₂)~~

ADD SPACER & ACTIVATOR (1:1 RATIO) (SEE PAGE 122 FOR SPACER STRUCTURE)

CAPPED (1:1 CAP 1:CAP 2), WAIT, WASH

OXIDIZED, WAIT, WASH

DEBLOCKED, WAIT, WASH

ADDED UV-PG-C-P_i & ACTIVATOR (1:1) RATIO WAIT, WASH

CAPPE, WAIT, WASH

OXIDIZED, WAIT, WASH

UV LIGHT (15 MIN) NO FILTER, USED MASK GRID

TOOK OUT OF RIN CHAMBER

REST IS UNDER FLOOD

ADDED ACTIVATOR 60-P_i IN 1:1 RATIO, WASH

OXIDIZED, WASH, WASH

WASH w/ ACETONE

LOOK THROUGH MICROSCOPE

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Date

11-12-97

Invented by _____

Date

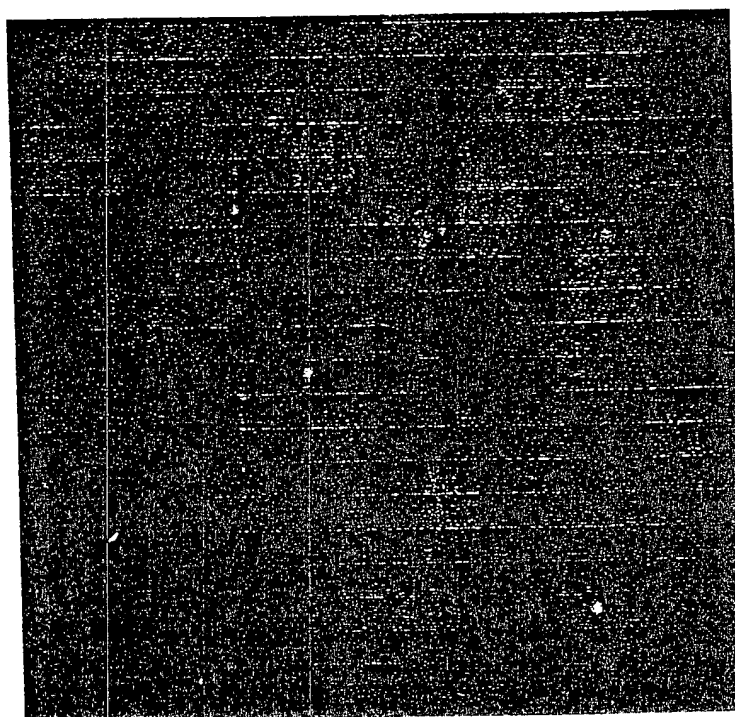
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D. R. R. R.

RESULTS

Exhibit

C-6



e N . _

Precipitate by pouring into 20-25 volumes of hexanes at -20°C

9) Column chromatography EtOAc - CH_2Cl_2 - Et_3N
45:45:10

Slide modification with $(\text{EtO})_3\text{Si}(\text{CH}_2)_3\text{N}^{\text{Na}}_{\text{Van}}$

(1) Used Sigma (S8902) plain precleaned Microscope Slides

(1) Kept at 70°C for 3 min in 10% aqueous NaOH

(2) rinsed with distilled water

(3) kept in 1% HCl for 1 min, rinsed with H_2O

~~(4) dried for 5 min at 35°C under~~

~~Argon~~

(4) rinsed with 95% EtOH

(5) kept for 15 min in 1%

$(\text{EtO})_3\text{Si}(\text{CH}_2)_3\text{N}^{\text{Na}}_{\text{Van}}$

in 95% EtOH in

water with 95% EtOH

(6) Rinsed with 2-propanol, water

(7) Dried in a oven at 90°C for 5 min

20-55

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Date

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Date

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Test if slide modified.

Used clean and modified slide

In argon chamber added a drop of activator, followed by a drop of 0.05 M CX3-phosphoramidite in CH_3CN ; wait for 1 min. washed with MeCN, dipped in oxidizer solution for 30 sec washed with CH_2CN , 95% EtOH, H_2O , acetone until CX3-dye was washed out of clean slide. Dye remained on modified slide

Modified slide for real experiment with HEG-deriv. / T-phosphoram.

1st Synthesis

Used reaction chamber. Reaction occurred between two modified slides.

- (1) mixed activator + phosphoramidite (1:1 ratio) \rightarrow inject, wait for 1 min
- (2) washed with MeCN
- (3) mixed cap I + cap II (ratio, 1:1) \rightarrow inject, wait for 1 min

To Page No. _____

Witnessed & Understood by me,

Date

10-3-97

Invented by

Recorded by

Date

No. _____

(4) washed with CH_3CN

(5) oxidizer \rightarrow inject
wait for 1min

(6) washed with CH_3CN

(7) ^{go to Greg's place} and wash with CH_3CN , irradiate using UV filter
(8) repeat steps (1)-(7) 3 times

\rightarrow broke flask with phosphor-

~~8) made mask from foil using needle~~

(9) mix activator + phosphoramidite CY 3 \rightarrow inject, wait 1min
washed with CH_3CN

(10) oxidizer \rightarrow inject, wait for 1min

(11) washed with CH_3CN

~~(12) made mask from foil using needle~~

~~(13)~~

(13) Took slides apart
washed them with CH_3CN

(14) made a picture showing
stripes of made oligos
like stripes on foil mask

\Rightarrow Chemistry is working

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Date

10-3-97

Invented by

Y

Date

Recorded by

Y